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Sanga, Ravi

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From: Ernst, William D <william.d.ernst@boeing.com>
Sent: Thursday, January 29, 2015 10:37 AM
To: Sanga, Ravi
Cc: Blankenship, Melissa; Bartus, Dave; Freier-Coppinger, Romy (ECY); Dyer, Miles; Tom Colligan; Dee Gardner
Subject: RE: JFOS approximate data for 3rd Mod

Hi Ravi, sorry for the delay to your email below. We are able to provide this initial response despite the complexities involved.

In response to your request for the added soil volumes and costs to excavate down to 42 feet to remove the deeper outlier sample at ~2ppm, we have done a brief evaluation of what this would add to the job from an engineering perspective. We conclude there are four options that would allow us to go that deep. All four fundamentally change the nature of the project and add complexity, risk and cost. This is mainly due to two factors: 1) the Boeing sheetpile is quite thin and, without more work, the stresses placed upon it to excavate to 42 feet would cause it to bulge and rupture, and 2) the newer sheets are 60 feet long and will need to be installed and maintained in a manner to ensure structural integrity of the temporary upland cofferdam walls.

To repeat from when we met on Jan 14, we do not believe that this isolated result of 2.1 ppm PCBs from boring T2B4 between 40 and 42 feet is real, in-place contamination. It is overlain by at least 14 continuous feet of soil with PCB concentrations that range from 0.09 to 0.56 ppm. Also, another borehole sample (JF-DGP3) a few feet away at the same depth did not detect any PCBs (all PCBs were non-detect beginning at 32 feet at that location). We conclude the 42 bgs sample is due to carry-down contamination from overlying more contaminated soil which fell and was pushed down the uncased Geoprobe borehole formed by that method of sample collection. In any case, the following is an indication of what would be involved if we did have to dig that deep.

1. **Dewatering on the Boeing side of the 2-66 sheetpile.** This would be necessary to relieve hydrostatic pressure on the Boeing sheetpile. To remove and sustain necessary dewatering this would require two 16" dewatering wells to 60' deep with 40' screens with submersible pumps. We would need to bring in electrical drops to the site. Also since the water that would be pumped is contaminated with a solvent taint, we would have to set up a system to handle and treat that water and discharge it to METRO. It would necessitate new coordination with Melissa under the Plant 2 RCRA Order, since that sheetpile is a RCRA Unit that would otherwise not require dewatering. The flow rate would be significant, an estimated 100 gpm for a minimum of 2 weeks and then sustained for the duration of the JFOS action. Permitting this amount of discharge to the sewer would be necessary, there may be no piping nearby that big enough to take that flow. These are initial thoughts only.
2. **Place additional sheetpile alongside 2-66 sheetpile.** Buy more sheets and completely enclose the JFOS area to be excavated by running a new alignment of sheets parallel to the Boeing sheets (in other words, not rely on the Boeing sheets for support). The problem with this is that it would leave about a one foot wide veneer of soil in-between the existing Boeing sheets and the new temporary sheetpile alignment that could not be excavated out as it would not be accessible. This soil has relatively lower levels of contamination, but it's part of the JFOS Order and would need to be addressed somehow. At this point if given this option, we don't know how to remove that soil veneer. This is the reason we want to utilize the Boeing sheets, because soil contamination extends up to (but does not cross) the Boeing sheets and we need to get that soil out, which our current plan allows for.
3. **Braced excavation with dewatering inside the cofferdam and excavation in the dry.** This remains undesirable due to safety risks and added costs, but as we discussed on Jan 14 bracing would be added for internal support, and we would dewater inside the cofferdam and excavate "in the dry" to allow the bracing to be installed at successively greater depths. The downside, besides the dewatering challenge is that excavation in-between the braces is very difficult due to the lack of open space and it would require putting men down the hole to dig soil by hand and with a micro excavator and have the soil hauled up with a cable crane. Work down that deep is difficult and it also is a confined space with special safety and ventilation requirements. We rejected (and still reject) this option as we don't want to take on these safety risks, but if required to go to 42 bgs it would need to be reconsidered.
4. **Drilled shafts where needed.** We could imagine augering to that depth and backfilling with CDF. An extra mobilization and several weeks added to field implementation would be needed, probably best done after completing the preferred excavation option presented on Jan 14.

For the first three options it would not be possible to dig soil out by an excavator as we would if going to more shallow depths. It is simply too far down for even a long reach excavator, so we would have to set up a cable crane and clamshell. Clamshell excavation

will be a lot slower than an excavator, so the whole project will take much longer and be much more expensive. The added volume of soil to 42bgs is approximately 300 cy.

The above are our best, quick ideas from an engineering perspective to go that much deeper. Each option adds a significant additional cost and weeks to the field schedule, and for # 3 safety concerns is a problem for us. We still need to estimate the added cost of each one more accurately, but since you may only need a cost range we roughly estimate that it could almost double the upper cost figure we provided, i.e., cost perhaps as much as $3.5 million depending on the option and problems encountered. The additional soil volume involved is trivial by comparison considering the challenges to go that deep. If this remains of interest to you we need to discuss your objectives driving that work scope, in terms of the risk being mitigated and other options that may comprehensively manage that risk for all concerned.

Please let us know your thoughts. Separately, we understand that Jeff Kray for JFC and Chris Baird for Boeing will be talking with Richard Mednick early next week about your edits to our 3rd Modification draft, including the benefit of drafting instead a new Action Memo. We look forward to that exchange and progress as well. Thanks.

Will Ernst
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From: Sanga, Ravi [mailto:Sanga.Ravi@epa.gov]
Sent: Tuesday, January 20, 2015 1:30 PM
To: Ernst, William D
Cc: Blankenship, Melissa; Bartus, Dave; Freier-Coppinger, Romy (ECY)
Subject: RE: JFOS approximate data for 3rd Mod

Hi Will – In my opinion after seeing the presentation last week, it looks like there maybe a chance of going down 42 ft in isolated areas. Also can you give me the approximate cubic yards of soil that may be removed ?

From: Ernst, William D [mailto:william.d.ernst@boeing.com]
Sent: Thursday, January 15, 2015 10:20 AM
To: Sanga, Ravi
Cc: Blankenship, Melissa; Bartus, Dave; Freier-Coppinger, Romy (ECY)
Subject: JFOS approximate data for 3rd Mod

Ravi,

Per your request, we are providing you these initial estimates of the depth of excavation, cost and tonnage of soil for the upcoming Mod 3 work. The cost estimate is preliminary as we don't have contractor bids, so we have given you a range. This assumes that our preferred method of an unbraced uplands cofferdam, with excavation of soil below the water table "in the wet" and overlying Subtitle D soil segregated from Subtitle C soil and other assumptions as discussed on Jan 14, will be implemented.

Maximum depth below current ground surface to be excavated – approximately 32 feet
Tonnage of Subtitle D soil (soil above the pipes is not affected by the source pipes and is < 50 ppm) - approximately 400 tons
Tonnage of Subtitle C soil (soil at or below the pipes is all considered to be > 50 ppm) - approximately 2,000 tons
Estimated cost (total project, including planning, construction, EPA oversight and reporting) - $1.7 to 1.9 Million

Thank you for the time to discuss this work yesterday. Please let us know of any other questions.

Will Ernst
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